



APPENDIX E

Guidelines for Preparing Capital Project Cost Estimates (Form C100)

The Capital Project Cost Estimate Form (Form C100) is a tool to assist agencies and institutions in creating a project construction budget. It can also be an analytical tool to help agency and institution management, as well as executive and legislative decision-makers, understand the costs and many other parameters associated with the project. And, in a similar manner, it can measure capital construction performance at both the agency/institution level and in a statewide perspective. The C100 is NOT an accounting tool; it does not create lines of cost codes and associated funds for payment of the various budgeted items.

Cost planning is different from cost estimating. Cost planning occurs before design begins and relies on historical or standard industry data to predict the project's probable cost. It answers the question, "Within what range will the project budget fall after the project is fully designed?" On the other hand, cost estimating refines the probable project cost from drawings and specifications. The C100 is a cost estimating activity that is created through more defined project information.

The C100 provides both a detailed and summarized cost estimate for capital projects and identifies the principal assumptions used for cost estimates. Every project is unique; consequently, the list of cost items on the C100 is not inclusive. Cost items other than those listed on the C100 can be included, if known, or subsequently identified as more information about the project becomes available. Costs specific to each project must be developed based on the need for that project.

The C100 form and model shall be the one provided and maintained by the Office of Financial Management (OFM). Use of any other form or model will result in automatic rejection of the Predesign submittal by OFM.

General Administration Supplemental Guidelines

In order to assist client agencies in developing capital budgets, the Department of General Administration Division of Engineering and Architectural Services (E&AS) has prepared a supplement of suggested guidelines to the Capital Project Cost Estimate Instructions. For a copy of the supplement, contact E&AS at (360) 902-7272 or <http://www.ga.wa.gov/eas/EA-References/SupInst.doc>.

Sources of Cost Estimates

Cost estimates originate from the agency's technical staff, outside consultants, or the Division of Engineering and Architectural Services (E&AS) within the Department of General Administration. Cost information may be derived from historical information from the agency or E&AS on projects similar to that being considered or from unit-cost/square-foot-cost information from industry standard estimating guides (such as R.S. Means, Dodge, or other national standards). Quantity takeoff estimates may be based on specifically determined project components and design configurations (e.g., as shown in architectural drawings and specifications).

Cost estimates are refined as more project specific information becomes known from predesign or design activities. Refined cost estimates should include the following:

- **More Specific Determinations of Project Size, Complexity, and Quality.** As more detailed quantity takeoff estimation becomes available, cost estimates should be prepared using this technique as much as possible. Even if unit-cost figures must still be used, they should be broken down into the smallest reasonable cost categories. Ultimately, detailed construction cost estimates can be prepared from the final design documents.
- **Further Identification of the Attendant Costs of the Construction Program.** Evaluate the inclusion of items such as those shown in the Capital Project Cost Estimate. Denote and provide costs for items discovered that are not shown on the form. Many such issues do not become apparent until predesign and preliminary design activities are conducted.

Design and Consulting Services Costs

Basic design services costs are automatically calculated on the C100. These fees are computed from an OFM derived fee schedule multiplier on the maximum allowable construction cost for the project. The fee schedule considers the building type, complexity and estimated construction cost. Basic design services do not necessarily include all of the design disciplines or activities required for a particular project. Additional design services that are frequently required for many public works projects are listed on the C100. Guidelines for Determining Architect/Engineer Fees for Public Works Building Projects can be found in the 2005-15 Capital Budget Instructions or at <http://www.ofm.wa.gov/budget/instructions/capital.asp>.

Base Month Cost Adjustments

The cost adjustment factors provide escalation multipliers that are applied to the aggregate cost categories indicated on the cost estimate summary section of the C100. Escalation factors are determined by OFM and are automatically calculated on the various elements of the cost estimate based on the inflation rate applied to the estimated time from the base month and the design or construction event.

Project Schedule Estimates

The Project Schedule by Phase/Activity chart below provides a historically based estimate of the duration of various activities of the design and construction, expressed as a function of project value. Other scheduling considerations also are identified. In addition, the overall schedule must account for the anticipated budget approval cycle, funding cycles, and other activity cycles particular to each agency. The planning cycle itself impacts the project development schedule.

The project scheduling process requires careful and detailed planning. Consider not only the desired start/finish dates, but also the intermediate milestones that are to be achieved. Evaluate the schedule requirements both for activities occurring before the milestones. Creating even the most preliminary project schedule will involve at least two points in time: project start and project completion. Depending on the specific situation, milestones may be established by choice or predetermined by external constraints such as weather considerations.

Actual project durations depend on the adequacy of programming and planning, complexity of the design, use of concurrent activity, streamlining of the agency approval process, and the regulatory environment.

Project Schedule by Phase/Activity
Duration listed in Weeks

| <u>Project Phase/Activity</u> | <u>\$20,000,000</u> | <u>\$10,000,000</u> | <u>\$5,000,000</u> | <u>\$2,000,000</u> | <u>\$700,000</u> | <u>\$300,000</u> |
|---|----------------------------|----------------------------|---------------------------|---------------------------|-------------------------|-------------------------|
| Predesign | | | | | | |
| Project Assignment | 1 | 1 | 1 | | | |
| Scoping | 4 | 4 | 3 | | | |
| A/E Selection | 4 | 4 | 4 | | | |
| Perform Study | 26 | 20 | 15 | | | |
| Subtotal (Predesign) | 35 | 29 | 23 | 0 | 0 | 0 |
| Consultant Selection | | | | | | |
| Project Assignment | 1 | 1 | 1 | 1 | 1 | 1 |
| Scope and Cost Verification | 4 | 4 | 4 | 3 | 2 | 2 |
| A/E Selection | 6 | 4 | 4 | 4 | 2 | 2 |
| A/E Fee Negotiation | 2 | 2 | 2 | 2 | 1 | 1 |
| A/E Agreement and NTP | 1 | 1 | 1 | 1 | 1 | 1 |
| Subtotal (Consultant Selection) | 14 | 12 | 12 | 11 | 7 | 7 |
| Design | | | | | | |
| Schematic Design | 17 | 15 | 13 | 10 | 5 | 3 |
| Schematic Design Approval | 2 | 2 | 2 | 2 | 1 | 1 |
| Value Engineering Study * | 3 | 2 | 2 | 2 | | |
| Design Development & Permits | 17 | 13 | 11 | 10 | 5 | 5 |
| Design Development Approval | 2 | 2 | 2 | 2 | 1 | 1 |
| Contract Documents | | | | | | |
| Construction Documents | 40 | 30 | 22 | 12 | 8 | 5 |
| Constructability Review * | 3 | 2 | 2 | 2 | | |
| Construction Documents Approval | 4 | 4 | 3 | 2 | 2 | 2 |
| Printing/to Bid | 1 | 1 | 1 | 1 | 1 | 1 |
| Subtotal (Design & Documents) | 89 | 71 | 58 | 43 | 23 | 18 |
| Construction | | | | | | |
| Bid Period | 4 | 4 | 4 | 3 | 2 | 2 |
| Contract Award | 2 | 2 | 2 | 1 | 1 | 1 |
| Contract Notice to Proceed | 1 | 1 | 1 | 1 | 1 | 1 |
| Subtotal (Bid to Award) | 7 | 7 | 7 | 5 | 4 | 4 |
| Construction Time | 90 | 72 | 60 | 44 | 33 | 20 |
| Punchlist/Closeout | 8 | 8 | 6 | 6 | 3 | 2 |
| Commissioning * | 8 | 8 | 6 | 6 | 3 | 2 |
| Subtotal (Construction) | 106 | 88 | 72 | 56 | 39 | 24 |
| <u>Approximate Project Time (Predesign not included)</u> | | | | | | |
| Total in Weeks | 216 | 178 | 149 | 115 | 73 | 53 |
| Total in Months | 54 | 44.5 | 37.3 | 28.8 | 18.3 | 13.3 |
| Total in Years | 4.2 | 3.4 | 2.9 | 2.2 | 1.4 | 1 |

* Can overlap with other tasks

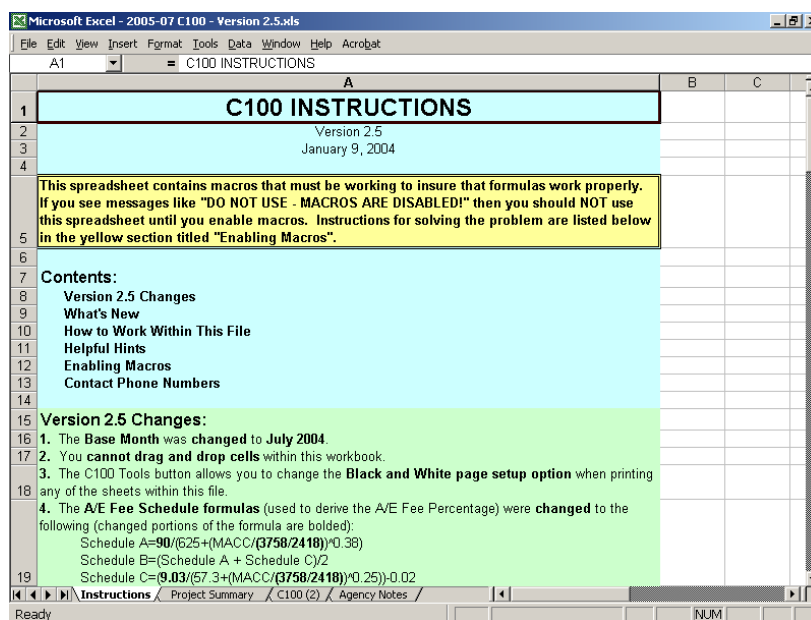
Using the C100 Workbook

The C100 is an Excel workbook that is protected. Consequently, the worksheets within it cannot be moved or deleted in the usual manner. This protection is necessary to ensure an accurate rollup of the C100 detail in the format required by Capital Budgeting System (CBS) for data import. As a result of this protection, you will find that many Excel functions are disabled while you are working within this file. These differences are listed in the instruction tab within the C100.

C100 Worksheets

The C100 contains the following worksheets:

Instructions worksheet: Contains a quick summary of new features and instructions on how to use the new features within the file. It also gives some helpful hints on how to work most efficiently, help in getting the macros running, and contact information when you have questions.



Project summary worksheet: Summarizes all C100 worksheets within the C100 to the level required by CBS. Once the entire C100 is completed you can import the data from this worksheet directly into a project in CBS. Or you can enter it manually.

Microsoft Excel - 2005-07 C100 - Version 2.5.xls

File Edit View Insert Format Tools Data Window Help Acrobat

STATE OF WASHINGTON

AGENCY/INSTITUTION PROJECT COST SUMMARY

Show C100 Tools

Agency

Project Name

Project Number

Contact Information

Analysis Date

Analysis By

Contact Phone Number

Statistics

| | Primary | Secondary | Total |
|--------------------------------|---------|-----------|-------|
| Gross Square Feet | 0 | 0 | |
| Net Square Feet | 0 | 0 | |
| Efficiency | 0% | 0% | |
| Escalated MACC Cost per Sq.Ft. | 0 | 0 | |
| Building Type | | | |
| Is project a remodel? | | | |
| A/E Fee Class | | | |
| A/E Fee Percentage | | | |

Schedule

| | Start Date | End Date |
|--------------------------------|------------|----------|
| Predesign (mm-yyyy) | | |
| Design (mm-yyyy) | | |
| Construction (mm-yyyy) | | |
| Construction Duration (months) | | |

Ready

C100 worksheet: A cost estimate worksheet for the entire project or a sub project. It uses current year cost estimates, project schedule, type of project and various rates to provide escalated costs of the final project. Each C100 worksheet is calculated independently from other C100 worksheets within the same C100. This allows you to have more than one C100 worksheet within a single C100. For example, you may be repairing the roofs on several buildings at different times during the biennium. In this case, you could have a C100 worksheet for each building. Totals of the entire project are summed up on the Project Summary worksheet.

Microsoft Excel - 2005-07 C100 - Version 2.5.xls

File Edit View Insert Format Tools Data Window Help Acrobat

STATE OF WASHINGTON

AGENCY/INSTITUTION PROJECT COST ESTIMATE

Show C100 Tools

AGENCY:

PROJECT NAME:

PROJECT NUMBER:

LOCATION:

Analysis Date:

Analysis By:

Contact Phone #:

WARNING: Design & Construction dates are used to escalate costs. Some sections will have ZERO escalated costs when dates are missing! A Design Date is Missing! A Construction Date is Missing!

STATISTICS:

| | Primary | Secondary |
|-------------------------|------------------------------|------------------------------|
| Gross Square Feet | | |
| Net Square Feet | | |
| Efficiency | 0% | 0% |
| Estimated Cost per S.F. | 0 | 0 |
| Building Type: | | |
| Is project a remodel? | <input type="checkbox"/> Yes | <input type="checkbox"/> Yes |
| A/E Fee Class | | |
| A/E Fee Percentage | 0.00% | 0.00% |

Project Schedule

| | Start Date |
|---------------------------------------|------------|
| 1. Predesign (m/d/yyyy): | |
| 2. Design (m/d/yyyy): | |
| 3. Construction (m/d/yyyy): | |
| 5. Construction Duration (in Months): | 0 |
| State Construction Inflation Rate: | 3.00% |
| Base Month: | Jul-2004 |

Project Cost Summary

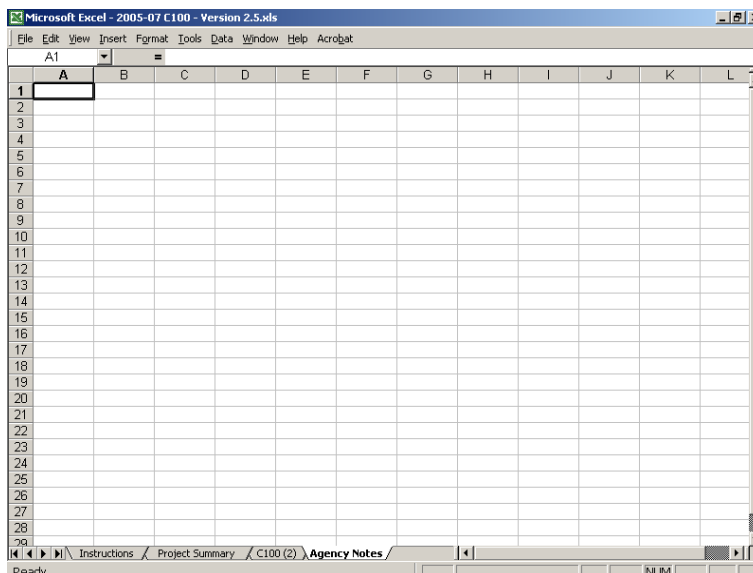
| | |
|-----------------------------|-----|
| Primary MACC (escalated): | \$0 |
| Secondary MACC (escalated): | \$0 |
| Current Project Total: | \$0 |
| Escalated Project Total: | \$0 |

Includes Formula Overrides:

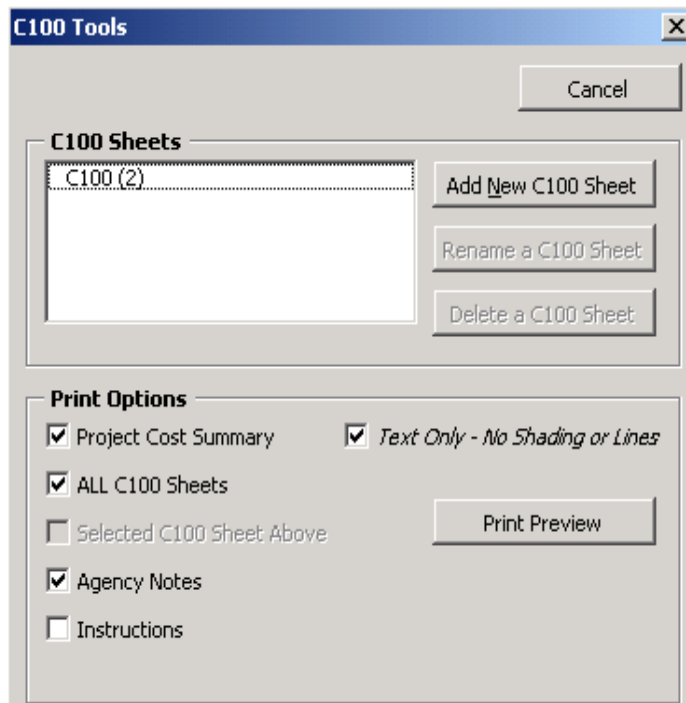
No

Ready

Agency Notes worksheet: Agencies can keep their own notes about the project on this worksheet. It can be formatted and customized by each agency.



Adding, deleting, renaming and printing worksheets – Press the “Show C100 Tools” button located in the upper left corner of the Project Summary or C100 worksheets. The following C100 Tools screen will be displayed.



C100 Options: The upper section labeled “C100 Sheets” gives you the ability to add New C100 worksheets, rename C100 worksheets or to delete C100 worksheets.

Add a New C100 Worksheet: Press the “Add New C100 Sheet” button to add a new C100 worksheet to the C100 workbook using a default worksheet name (e.g., C100(3)).

Rename a C100 Sheet: Select one of the C100 Sheets listed under “C100 Sheets”. Press the “Rename a C100 Sheet” button and you will be prompted to enter a new name for the selected C100 worksheet.

Delete a C100 Sheet: Select one of the C100 Sheets listed under “C100 Sheets”. Press the “Delete a C100 Sheet” button. You will be prompted to make sure you really want to delete the selected sheet.

Print Options: The lower section labeled “Print Options” gives you the ability to preview any combination of the worksheets within the C100. Each selected sheet is properly formatted and displayed in a Preview window so that you can make any last minute adjustments before printing. It also allows you to turn off the shading and lines for a faster print.

Selecting worksheets: Select one or more of the worksheets by clicking on the Print Option checkboxes. The “Selected C100 Sheets Above” option will only be enabled when you have one or more C100 sheets selected in the “C100 Sheets” section. A check mark means the worksheet will be included.

Text only – no shading or lines option: When this option is checked, no lines or shading will be printed. This speeds up printing.

Print preview button: Press this button to preview your selections. You can make adjustments to the formatting and print your sheets from the preview window.

Press the “Cancel” button to close the C100 Tools screen.

For an electronic version of the C100 to be used for the predesign, refer to OFM’s web site at: <http://www.ofm.wa.gov/budget/instructions/predesign/contents.asp>. A copy of the C-100 can also be found in Appendix F.

Building the C100

1. General Items

- Information and cost data can only be entered in the white cells. Complete ONLY those blanks that apply to your project.

- If an item is estimated to have no cost or is not applicable to the project, leave blank or insert a “0.”
- If text is needed to explain a cost, explain under “Notes” at the bottom of the C100 worksheet.
- Blanks are provided to add items not listed on the form.

2. Specific Items

- Under **Project Schedule**, enter the month, day, and year for each phase. Cost adjustment factors for inflation are established by OFM. The C100 will automatically calculate the escalation multipliers and escalated costs.
- In the **Statistics** section, “**Primary**” and “**Secondary**” reference the construction work. Primary work is a new facility; secondary work is remodeling of an existing facility. Because of other automatic calculations in the C100, it is important to enter cost data in the correct and appropriate designations. If data is entered for primary and secondary construction, ensure all statistics are complete, along with the primary and secondary Maximum Allowable Construction Cost (MAA).
- GSF is the “**Gross Square Feet**” of building area contained in the project based on American Institute of Architects (AIA) Document D-101, *The Architectural Area and Volume of Buildings*.
- NSF is the “**Net Square Feet**” area (sometimes called assignable square footage) of a structure that excludes stairwells, elevator shafts, corridors, toilet rooms, and wall thickness. The area should be measured from the predominant inside finish of permanent outer walls to the office side of corridors or permanent partitions, and to the centerline of walls separating adjacent assigned spaces. Where there are interior spaces surrounded by corridors, measurement shall be from the inside face of enclosing walls. Included should be space subdivisions for occupant use. Deductions should not be made for columns and structural projections necessary to the building or for partitions subdividing space.
- The ratio of NSF/GSF is referred to as the building’s “**Efficiency**” and is automatically calculated by the C100. It only applies to buildings. The chart below provides guidelines for various types of buildings.
- The agency’s program space is in terms of net (assignable) square feet (NSF) whereas the construction budget is in terms of gross square feet (GSF). The “**Estimated Cost per S.F.**” is automatically calculated by dividing the escalated maximum allowable construction cost by the GSF. The chart below provides guidelines for various types of buildings.

Efficiency Guidelines

| Space Type | Percent Budget Range |
|---------------------------|----------------------|
| General Government | |
| Office Buildings | 72-78 |
| Computer Facilities | 60 – 65 |
| Library Facilities | 75 – 80 |
| Auditorium | 65 – 75 |
| Cafeteria | 65 – 70 |
| Medical | 50 – 60 |
| Parking | 90 – 95 |
| Warehouse | 90 – 95 |
| Laboratory Facilities | 55 – 60 |
| Higher Education | |
| Teaching/Classrooms | 65 – 70 |
| Offices/Administration | 75 – 80 |
| Teaching/Laboratories | 60 – 65 |
| K-12 Facilities | |
| | 80 – 85 |

Cost Guidelines

| Space Type | \$/sf Average-Max |
|---------------------------|-------------------|
| General Government | |
| General Office Buildings | 150 - 250 |
| Correctional Housing | 280 – 320 |
| Parking Structures | 100 - 150 |
| Warehouse | 100 - 150 |
| Other | 55 - 60 |
| Higher Education | |
| Teaching/Classrooms | 170 - 230 |
| Offices/Administration | 150 – 250 |
| Teaching/Laboratories | 200 – 290 |

- Selection of a “**Building Type**” establishes the Architect/Engineer (A/E) fee class and associated basic design fee schedule. The C100 automatically enters the fee class and fee percentage.
- The check box “**Is project a remodel?**” adds 2 percent to the basic design service fees to compensate for the added complexity associated with as-built facilities.
- The “**Contingency Rate**” is an allowance for uncertainties associated with estimating costs for design services and construction. Contingency is generally estimated at 3 to 5

percent. The C100 Form will automatically apply the contingency rate to primary and secondary design service fees and Maximum Allowable Construction Cost (MACC). Do not add additional contingency within the MACC or design service fees.

- The “**Management Reserve**” is an allowance for unanticipated changes beyond control of the A/E, construction contractor, or owner. The reserved amount is a function of risk and uncertainty and may be non-existent for some projects; the typical range is 2 to 5 percent for new construction and up to 10 percent for renovation projects. Management reserve is automatically applied to the primary and secondary MACC in Form C100.
- “**Tax Rate**” is the sales tax rate for the location of the project.
- Most major capital projects are subject to allowances for artwork under RCW 43.17.200 or RCW 28B.10.027 for higher education institutions. Check the box “**Art Requirements Applies**” to automatically calculate the artwork allowance for all applicable projects. Higher education institutions should check the box “**Higher Ed. Institution**” to automatically calculate the artwork allowance on renovation or remodel projects.
- Check the box “**Project Admin by GA**” only if the project will be administered by the Department of General Administration (GA) Division of Engineering and Architectural Services (E&AS). Capital appropriations for cost to an agency/institution for project management/administration are limited to specific tasks (see Section 5). Agencies/institutions who are clients of E&AS receive no additional, separate capital appropriations for project management. (See Part 4 below.)
- “**Alternative Public Works Project**” checkbox identifies this project as qualifying and programmed to use alternative public works contract processes as defined in RCW 39.10. This checkbox allows entry for cost estimates associated with design-build and general contractor/construction manager types of contracts. (See Part 3 below.)
- The **Project Cost Summary** data is automatically retrieved from the appropriate sections of the C100.
- **Formula Override** options are available (as “white boxes”) for many cost entries throughout the C100 Form to allow for better, refined cost estimates. Generally, the override amounts should be less than the calculated amount. Provide explanation of all override entries in the “Notes” section at the bottom of the C100.
- **Acquisition Costs** include not only the cost of purchasing or leasing a site and/or facilities, but also all attendant costs necessary to prepare the property for agency use. The costs of site improvements, right-of-way, or conditions on the purchase/lease must be considered under the cost of acquisition if such items are required in order to prepare the property for its intended purpose. Although many of these costs may be deferred to a construction cost, they should be considered during the site evaluation process.
- **Consultant Services** are costs associated with architect and engineering (A/E) services from private consulting firms. **Basic Design Services** fees are automatically calculated by the C100 based on the selection for “Building Type.” The calculated fees are the maximum amount; lower amounts can be entered in the form. Several subheadings are

included in the Consultant Services Section as a suggested listing of extra services that may be required to design the project. Agencies may add specific A/E services in order to fully capture all services needed for a successful project. Extra service costs include: costs to comply with completing the Predesign Manual requirements and the Environmental Impact Statement (EIS), which is a study of the present and future impact of the project on the environment, residents, and the economy. Agencies should review State Environmental Policy Act (SEPA) Rules WAC 197-11 for more information. Refer to the 2005-2015 Capital Budget Instructions Appendix B, OFM's *Guidelines for Determining Architect/Engineer Fees for Public Works Building Projects* (<http://www.ofm.wa.gov/budget/instructions/capinst/05-15capinstr/default.asp>) for details.

- **Construction Contracts** cost estimates are displayed using the *UNIFORMAT II — Standard Classification for Building Elements and Related Sitework System* (ASTM Standard E 1557). Using UNIFORMAT II ensures consistency in the economic evaluation of building projects over time and from project to project. “**Sitework**” costs are associated with site preparation and utility improvements external to the building footprint. “**Related Project Costs**” include on and off-site mitigation improvements imposed by local building/development jurisdictions. The elements listed on the C100 under “**Facility Construction**” are the UNIFORMAT II components common to most buildings. Project specific elements can be entered as well.
- The **Maximum Allowable Construction Cost** (MACC) is the summation of the cost estimates for the sitework, related project costs and facility construction.
- **Equipment** includes the costs of equipment and furnishings integral to the project. Equipment is not considered consumable and is obtained through contracts or the Office of State Purchasing within the Department of General Administration. Furnishings include items such as furniture, office equipment and other purchased items. Special construction items include the purchase and installation of office furniture, shelves, movable partitions, and any special program items that are not considered consumables and have a life expectancy of one year or more. See Section 4 of the 2005-1015 Capital Budget Instructions (<http://www.ofm.wa.gov/budget/instructions/capinst/05-15capinstr/default.asp>) for further guidance.
- **Other Costs** may include lease purchases, temporary utilities, security and/or escort services anticipated integral to the completion of a capital project. Costs of required permits and local jurisdiction fees (including building permit fees, plan check fees, impact and other permit fees) as appropriately imposed should be itemized in this section. (Do not include costs for permits, fees or bonds associated with the provisions of the general conditions of the public works construction contract since those costs are included in the estimates for the MACC.)

3. Alternative Public Works Contracts

Cost estimates associated with either the design-build or general contractor/construction manager (GC/CM) alternative public works contract methods should be specifically identified and itemized in the appropriate sections on Form C100.

- **Consultant Services Section:**

Extra Services, Separate Bid Packages - The additional cost to the A/E for preparation of separate bid packages not included in the traditional design/bid/build process (GC/CM only).

- **Construction Contracts Section:**

GC/CM Risk Contingency - maximum amount of 5 percent of the MACC may be added to the GC/CM MACC (but not the A/E fees).

Preconstruction Services - maximum amount of 5 percent of the MACC may be added to the GC/CM MACC (but not the A/E fees) for participation in preconstruction design meetings, life cycle cost design considerations, value engineering, scheduling, design cost estimating, constructability review, project management services, devising alternative construction options for cost savings and planning for sequencing of the work.

Fee - estimate for the fixed percent fee bid by the GC/CM multiplied by the MACC.

Bid General Conditions - estimate for temporary work and fees performed by or paid by the GC/CM to accomplish the scope of work.

4. Engineering and Architectural Services

The Department of General Administration's Engineering and Architectural Services (E&AS) provides project management services to state agencies as required by RCW 43.19.450. E&AS project management services are funded separately from the agency's capital budget request (except when the total project funding is greater than \$20 million or the funding is from a non-state source). The services are essential and mandated activities defined as core services and are included in E&AS's responsibilities list for general public works projects of normal complexity.

The department may negotiate agreements with agencies for additional fees to manage projects financed by financial contracts, other alternative financing, projects with a total value greater than \$20 million, or for the nonstate funded portion of projects with mixed funding sources. Additional fees for Engineering and Architectural Services should be included in the C100. Please contact the GA Division of Engineering and Architectural Service at (360) 902-7227 for an estimate of project management costs.

In addition, for agencies using E&AS for project management, if you intend to use formal alternative public works procedures such as Design-Build or General Contractor/Construction Management, additional project management costs may be required and should be included in the capital budget request. Please contact E&AS for an estimate of these supplemental project management costs.